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ABSTRACT

A 16-item evaluation form is presented to aid in selection of appropriate computerized game materials for preschool children. The form was derived from a 32-week-long study involving 66 children 3, 4, and 5 years of age who were allowed to play computer games during free play or work time while attending a modified Montessori preschool program. In the first phase of the study, children progressed at their own pace through some or all of 24 selected programs sequenced on the basis of complexity of motoric skill requirements, content, and variety of presentation techniques. During the second phase, children were also given the opportunity to attempt programming and problem solving in 18 additional games using the Logo language, a floor turtle, and a small robot. Information recorded each time the computer was used included (1) name of game; (2) who selected the game (child or teacher); (3) reason game was selected; (4) time spent with the game; (5) what the child liked best about the game; and (6) overall response of the child. Results suggest that the most popular game types were those in which children could press any key on the keyboard to get a response. Older children used the whole keyboard more frequently than did younger children and used games involving more than one motoric operation. Animation, color, music, getting to push keys, and a variety of images were game characteristics which were frequently liked by children who responded to item 5, above. (RH)

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TITLE PAGE

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SELECTING AND EVALUATING SOFTWARE FOR USE IN A PRESCHOOL CLASSROOM: FROM THE YOUNG CHILD'S AND RESEARCHER'S PERSPECTIVE

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A. Background

Computers are increasingly accepted and used as a natural part of today's educational experience with very young children. More and more commercial software programs are being written for preschool classrooms. At present, however, there are more questions than definitive answers about preschool-age children's interaction with computers. Questions concerning motoric and cognitive limitations of very young children need to be addressed when selecting software for preschool classrooms.

In previous computer studies reviewed by Brady and Hill (1983), the research which addressed questions about young children's use of computers revealed 1) that studies were generally conducted with very small groups of children; 2) that subjects were selected from university populations; 3) that very few research controls were administered; 4) that time segments, including total time on computers were short; and 5) that the children were usually over eight years of age. Because of these limitations, most past research was of little value to early childhood practitioners. Also, the software used in previous studies such as in Holland, 1971, Swigger & Campbell, 1981, Willis,Riley and Smith, 1982, and Bandilier, 1981 were basically designed by the researchers for purposes of their own inquiry. No study reviewed used or evaluated the software that was produced by major software distributors.

B. Description of Study and Procedures

This article addresses one segment of a thirty-two week research project on using computers with three, four and five year olds; namely,

selecting and evaluating software to use with young children. One component of this feasibility study was to assess the extent to which preschool children can use computers. This involved reviewing, selecting and sequencing computer packages to be used in the research project. The researchers based their selection of computer software on the following criteria: 1) limited duplication in concept or skill, 2) inclusion of the maximum variety of presentation techniques; and 3) allowance for appropriate motoric and conceptual skill levels of the subjects. They then sequenced the selected programs on the bases of the complexity of motoric skill requirements, content, and variety of presentation techniques. For example, programs were selected to introduce children to the computer components (keyboard, screen, monitor) and then to lead gradually to more complex conceptual experiences. During the second phase of the study children were given the opportunity to attempt programming and problem solving using the Logo language, a floor turtle, and a small robot.

The data collected gave the researchers some insight into what type of software was preferred by each age level. Every time a child interacted with the computer, a record form was completed which provided this information: 1) the name of the game; 2) who selected the game, child or teacher; 3) the reason the game was selected; 4) how much time was spent with the game; 5) what the child like best about the game; and 6) the overall response of the child. These data were collected over a thirty-two week period. The first phase extended for thirteen weeks and provided data on fifty-eight children. During this phase, twenty-four games were selected and sequenced. During the second phase, children were introduced to a floor turtle and robot, and

data on the use of software were based on only a seven-week period. Sixty-five children used the computer during this phase, with the addition of new software games, increasing the number of games to forty-two.

1. Subject and Daily Procedures

Data were collected on a total of sixty-six children who were three, four, or five years of age when they were introduced to the computer. The children attended the St. Peter's Early Childhood Center for two, three, or five half-days each week; participating in a modified Montessori program. The children were allowed to select the computer during free play or work time; this was a period of one hour and thirty minutes. The children put their name cards in a slot on the computer chart if they wanted turns on the computer. The length of time any one child could spend at the computer was determined by the number of children selecting to participate in the activity, divided by the amount of time available for computer use. Children could change their minds or leave before the allotted time was over. No child was forced to participate. Two graduate assistants recorded the data on daily record sheets and assisted the children in using the computer.

The games were presented sequentially during the first part of both phases. In the latter weeks of each phase, some allowances were made to accommodate two or more children at the computer at the same time in an effort to rekindle interest in the computer for the older male subjects whose interests had begun to lag. Very few children were presented all available games.

At the onset of each session, the graduate assistant reviewed with the child what games he/she had tried. Then the graduate assistant asked the child if he/she would like to do one of the mentioned games or a new one. If the child selected a new game, the graduate assistant followed the sequenced chart of games. If the child did not understand the game selected after assistance, the graduate assistant suggested an alternative game.

2. Game Type

The games were ranked by the motoric and cognitive difficulty required. Concept groups were also sequenced together. For example, all the alphabet games or counting games were ranked and sequenced together. The twenty-four games for phase one and the forty-two games for phase two were ranked by eight motoric operations required and by the number of concepts included in each game. The researchers did not use all presently available preschool software. Because of financial constraints and the newness of the software market, many current software packages were not available for inclusion in the project. Only sixteen software packages consisting of the forty-two games previously mentioned were reviewed and sequenced.

The motoric operations ranged from a program requiring no response from the child to having the child press as series of specific keys using the whole keyboard. Charts I and II relate the number of games in each category and the percentage of game use according to type of program. A percentage of time each type of software was selected by the children was calculated by dividing the number of times the software type was selected by the total number of times all software was used.

C. Results

1. Game Type Selection and Usage

As is evident in Charts I and II, the most popular game types were those in which children could press any key on the keyboard to get a response. No knowledge of a particular concept was required to be successful with these four games. Over 50% of the turns taken in phase one and 34% of the turns taken in phase two were of this game type. Three-year-olds selected this type of game 68% of the time during phase one and 69% of the time during phase two. In the older age groups, the percentage of turns taken using this game type decreased. Five-year-olds took 43% turns using this game type during phase one and 21% of turns using this game type during phase two.

Older children used the whole keyboard more frequently than younger children and used games involving more than one motoric operation. For instance, the fives in phase two selected the type of game that required two operations 29% of the time, whereas the three year olds selected this type of game only 2% of the time. The younger child selected the program types with fewer motoric operations and fewer concepts more often.

CHART I

PHASE I PERCENT AND NUMBER OF TURNS TAKEN BY PRESCHOOL AGE CHILDREN USING COMPUTER SOFTWARE

SOFTWARE GAME TYPE		NO. OF SOFTWARE GAMES	PERCENT AND NUMBER OF TURNS TAKEN BY AGE LEVEL							
MOTORIC OPERATION	CONCEPTS		3yr.		4yr.		5yr.		TOTAL	
			%	N	%	N	%	N	%	N
A. Requires no response	0	1	15	75	7	83	4	18	8	176
	1									
	2									
	3									
B. Press any single key	0	3	68	350	44	527	43	207	50	1084
	1									
	2									
	3									
C. Press any key in a specific area on the keyboard	0									
	1									
	2	2	.8	4	7	82	9	44	6	130
	3	1			2	26	3	13	2	39
D. Press a specific key in a specific area of the keyboard	0									
	1	1			.9	10	1	5	.7	15
	2	7	9.2	47	19	229	14.4	74	15.3	350
	3									
E. Press a designated key using the whole keyboard	0									
	1	4	6.9	35	13	153	13.7	64	10.9	252
	2	1	.1	1	2	26	2	12	2	39
	3									
F. Press a specific key and the return key	0									
	1	3*			3	35	4	19	2.2	54
	2	1			1	18	3	14	1	32
	3									
G. Use paddles and return key	0									
	1	1*			2	21	1	6	1	27
	2									
	3									
H. Press a series of specific keys using the whole keyboard.	0									
	1									
	2									
	3									
	4									
	TOTALS	25	512		1189		470		2171	

* Game requires more than one motoric operation.

CHART II

PHASE II PERCENT AND NUMBER OF TURNS

TAKEN BY PRESCHOOL AGE CHILDREN USING COMPUTER SOFTWARE

SOFTWARE GAME TYPE		NO. OF SOFTWARE GAMES IN	PERCENT AND NUMBER OF TURNS TAKEN BY AGE LEVEL							
MOTORIC OPERATION	CONCEPTS	THIS CATEGORY	3yr.		4yr.		5yr.		TOTAL	
			%	N	%	N	%	N	%	N
A. Requires no response	0	1	1	3	.2	1	3	1	6	5
	1									
	2									
	3									
B. Press any single key	0	4	69	141	27	94	21	70	34	305
	1									
	2									
	3									
C. Press any key in a specific area on the keyboard	0									
	1									
	2	3	2.5	5	5	21	6	19	4.8	17
	3	1	1	2	2	8	2	7	2	20
D. Press a specific key in a specific area of the keyboard	0									
	1	3	.5	1	5	18	6	20	4	39
	2	12	8	16	9	35	7	25	7.9	78
	3	1	8	16	16	58	11	34	12	108
E. Press a designated key using the whole keyboard	0									
	1	6	5	10	3.8	14	6	19	4.7	43
	2	2	1.9	4	.8	3	.6	2	1	9
	3									
F. Press a specific key and the return key	0									
	1	4*	2	4	26	92	29	94	21	190
	2	1	2	4	3	12	4	13	3	29
	3									
G. Use paddles and return key	0									
	1	2*			7	25	3.3	12	4.2	37
	2									
	3									
H. Press a series of specific keys using the whole keyboard.	0									
	1	1			2	7	4	12	2	19
	2	2*			1	3	1.3	5	.8	8
	3	1					.3	1	.1	1
	4	1			.8	3	.3	1	.4	4
	TOTAL	42	205		366		321			892

* Game requires more than one motoric operation.

2. Favored Characteristics of Games

After every session, the graduate assistant asked the child what he/she liked about the game(s). Some children shrugged their shoulders or didn't respond, perhaps because they didn't know how to answer the question, or they could not isolate characteristics of the game to mention. For children who responded, animation, color, music, getting to push keys, and a variety of images were game characteristics which were frequently liked.

One child selected a game in which the song "Old McDonald" played every time she pushed the F key. She did this over and over again, reaching a maximum of pushing the same key twenty-two times in one session. Some children enjoyed singing along with familiar tunes.

Some children stated that they liked to push the keys. Many children were surprised at first when they saw the monitor respond to their touching of the keys. One little boy was so delighted he laughed aloud.

Individual animated figures were also named by children when asked what they liked best about a game. Stars, bears, guns, butterflies, farm, cows, and horses were some of the objects named by the children.

The fact that most of the objects were in color was also noted as a preference of the children. During the ninth and tenth week, the children were introduced to a different monitor (smaller black and white screen) to ascertain if color and size of the screen were preference factors for young children. From thirty children involved in this experiment, thirty-two verbal comments were recorded. Twelve made these kinds of negative comments pertaining to the lack of color. "Color

shows up better." "I don't like this grey stuff." "When are the colors coming up?" "You can't tell what color these are. It just doesn't have color."

The smaller screen size on the black-and-white monitor also generated reactions from the children. Three positive comments were recorded: "I want the little one." "I can fill the whole screen." and "I like the little monitor." These were typical of the seven negative remarks: "I wish we had the big screen.", "This screen is too little." "This is tiny." "I don't like it; it doesn't show enough."

Children also mentioned that they liked to see different animated objects when they pushed one key. The children frequently pushed the same key over and over again, when the key produced different visuals each time. The children liked to guess which animal would appear. They appreciated unpredictable aspects of software games. These features of software games preferred by children should be considered in the selection of software for preschool age children.

D. Evaluation Criteria for Computer Software

There were some negative features for each of the sixteen software packages reviewed for this project. The differences in the quality of software were obvious and, whenever possible, consumers should preview software packages before purchasing them. The researchers developed the sixteen item evaluation form, which follows, to help with the selection of appropriate game materials for preschool children; some of these items have also been cited in the literature as important evaluation criteria for selecting software for young children. (Raliegh, 1983); (McCabe, 1983). By ranking the items and by giving extra weight to those items deemed to be important, consumers can select materials which are appropriate for each individual and for each situation.

1. The locus of control is in the child; the child directs the learning process.

   The software should leave preschoolers in charge. Some software on the market make children passive observers. The most effective learning takes place when children are active participants and are in control of the computer.

2. An interactive mode encourages the child to make choices and decisions.

   Children like to be in charge, and the more choices they make, the more control they feel. Most of the software on the market today allows children to make choices and to interact with the computer.

3. Realistic, high resolution graphics and animation are important.

   Children need to be able to identify figures which appear on the screen. Objects which visually signify given letters need to be easily recognizable.

4. Software should have bright, colorful graphics and animation.

   Children like objects that move.

5. Music is slow enough so children can sing along.

   Because children like to sing, games should pace songs at a speed so that they can join in. Familiar songs are best.

6. Software should present uncluttered figures/designs with large centrally located images.

   Young children focus on one item at a time and many times miss important items when they are off-center on the screen. If too many things happen on the screen, children become confused.

7. Concepts are significant and valid, considering the children's developmental level.

   Children need materials on their level of comprehension. Some software marked for preschool use requires reading skills; other software requires that children understand three or more concepts to respond correctly. These are not tasks for normal preschool children.

8. Reinforcement is appealing, motivating, varied, and fairly fast paced.

   Children should get immediate reinforcement, one of the strengths of using computers. Reinforcement for wrong answers should not be more creative than reinforcement for correct responses. When this happens, children are not learning the intended concepts.

9. Concepts taught by software should enhance classroom objectives.

   The learnings on the software need to be compatible with the goals of the preschool's program and with the objectives of the classroom teacher. Through repetition and learning about familiar concepts, children retain information and apply knowledge.

10. A program adapts to several levels of maturity.

    Because children in a typical preschool vary in their abilities, software should allow for different developmental levels. Three-year-olds need slower paced games with simple, one-concept learnings. Five-year-olds are capable of more complex problem solving opportunities and a faster tempo.

11. The learning sequence is clear; one concept is mastered before additional concepts are introduced.

    Software packages should sequence games according to complexity. Games that require children to differentiate similarities and differences and that also require identification of letters present problems: Do children fail to select the correct key (S or D) because they do not know letters, the association between similar/different, or the intended concept?

12. Cooperation, warmth, and gentleness are encouraged.

    Unlike the video games, most of the software available does encourage positive social values. This should be encouraged.

13. Objectives are clear, they state explicitly what children should learn.

    A carefully prepared manual that assists classroom teachers in relating other preschool activities to computer learnings is an important feature of software packages. It should state clearly the learning outcomes for each game.

14. Directions are clear; they state explicitly what the child should do.

    Directions for software should be simple, not complex or involved. They should leave no guess work as to what children are expected to do.

15. Wait time is short with easy program access and exit.

    Easy access with short wait time, good pacing of material, and easy exit are preferred for preschool software. Young children find it hard to wait. Some programs load after every key push. Wait time must be kept to a minimum. Some software also requires a certain percentage of the answers right before it will go on. The child gets frustrated when these limitations or demands are made.

16. A program can be identified by using a symbol on the disk and envelope.

    Since very young children cannot read, an identifying symbol on the diskette and envelope is important so that children can be independent of adult help.

Consumers must be cautious and think carefully about the values and objectives in using computers with young children. Once the decision is made to use the computer, consumers must be thoughtful in selecting software. At this writing, at least, eighty-three known software packages are available for very young children. A careful review and selection of software is essential to help insure successful experiences for young children when they use computers as one approach to learning.

Bibliography
Young Children and Computers

Bowman, Barbara. "Do Computers Have a Place in Preschools?" Unpublished Paper, Feb. 25, 1983. (Eric Document Reproduction No. Ed 231-504).

Brady, Elizabeth and Hill, Shirley. "Young Children and Microcomputers." Research in Review. Young Children 39, No. 3 (March 84): pp 49-61.

Burg, Karen. "The Microcomputer in the Kindergarten." Young Children 39, No. 3 (March 84): pp 29-33.

Hill, Shirley. "The Microcomputer in the Instructional Program." Arithmetic Teacher, February, 1983, pp 14-15 +.

Kimmel, Stephen. "Programs for Preschoolers." Creative Computing 7, No. 1 (October 81): pp 44-52.

McCabe, Deborah. "Not What, But How Do Individuals Learn? A Microcomputer Challenge." Academic Therapy 18, No. 5 (May 83): pp 529-532.

Papert, Seymour. Mindstorms: Children, Computers and Powerful Ideas. New York: Basic Books, 1980.

Prestrup, Ann McCormick. "Preschool Children Use Apple II to Test Reading Skills Programs." Unpublished Paper, Jan. 1981. (Eric Document Reproduction No. Ed 202-476).

"Pros and Cons of the Microcomputer: A Survey." Academic Therapy 18, No. 5 (May 83): pp 535-539.

Raleigh, C. Patrick. "Give Your Child a Head Start." Personal Software. (November 83): pp 36-53+.

Swigger, Kathleen. "Computer-Based Materials for Kids." Educational Computer Magazine. (September-October 82): pp 48-50.

Walker, Decker. "Reflections on the Educational Potential and Limitations of Microcomputers." Phi Delta Kappan 65, No 2 (October 83): pp 103-107.

Ziajka, Alan. "Microcomputers in Early Childhood Education? A First Look." Young Children 38, No. 5 (July 83): pp 61-67.